

## **In the United States Patent & Trademark Office**

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Application No. 10/711,651

Applicant: Thelma G. Manning, et al. :

Customer No. 32170 : Art Unit: 1793

Filed: 09/29/2004 : Examiner: Aileen Baker Felton

Customer Docket: 2000-021

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Titled: Single-Base Propellant Composition Using BuNENA As Energetic Plasticizer

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### **AFFIDAVIT PURSUANT TO 37 CFR 1.132**

State of New Jersey :  
: ss.  
County of Morris :

I, Thelma G. Manning, a resident of the township of Montville, in the county of Morris, State of New Jersey, in the United States of America, being duly sworn, depose and say that:

- 1.0 I am a named inventor with respect to the above cited patent application.
- 2.0 I am a chemical engineer, having graduated from the Manila University of Santo Thomas Catholic University in the Philippines, and MS in Chemical Engineering from N.Y Polytechnic University and am currently a Ph.D. candidate in Chemical Engineering at NJ Institute of Technology, degree expected in the fall of 2009.
- 3.0 I am now and have been since 1989, an employee of the U.S. Army, Research, Development, and Engineering Command (ARDEC), working in the Energetic Warheads Directorate, the Propulsion Technology and Direct Fire Branch, which is located at the Picatinny Arsenal, in Dover, New Jersey.
- 2.0 At ARDEC, my title is Chemical Engineer, where I have 20 years of experience in the engineering and development of energetic materials and prior to that I worked as a nuclear power engineer.

3.0 I have reviewed 35 USC 103(a), obviousness rejection regarding Claim 6, within the the December 30, 2008, Office Action regarding the above cited patent application. With respect to that rejection there are technical errors, regarding the citation of the Neidert et al. patent, U.S. 6,228,192, showing or implying that BuNena is substitutable for nitroglycerin in a gun propellant: specifically:

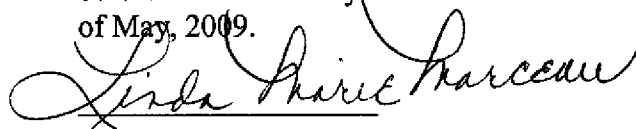
- (a) Neidert et al deals with rocket fuel, which is a low pressure environment, up to 10,000 psi; whereas, gun propellants require a minimum of approximately 30,000 psi up to about 125,000, i.e. 300% greater, at minimum, than rocket propellants – entirely different physical and chemical systems;
- (b) with respect to gun propellants -- BuNena is (1) a linear nitroamine; (2) very low energy material, (3) low flame temperature, (4) very insensitive; **in contrast**, nitroglycerin is a (i) a nitrate ester, (ii) which is non-linear in structure, (iii) very sensitive, (iv) very high energy and (v) hot flame temperature – in selecting a plasticizer, a gun scientist would not consider BuNena for any application that nitroglycerin would be considered for, nor would a scientist replace BuNena with nitroglycerin – they are opposite in application with respect to gun propellants;
- (c) further, experiments have shown that using greater than 10% BuNena overplasticizes a gun propellant with a nitrocellulose based binder/explosive system, this causes bubbles and further results in a brittle formulation, especially under cold temperatures under which gun propellants are required to perform. Brittle formulations can cause early detonation, or failure to sustain a shaped charge jet upon detonation.

4.0 For the reasons detailed above, there is no basis in the cited prior art, Hamilton et al., U.S. Pat. 5,602,361 and Neidert et al., U.S. Pat. 6,228,192, to combine 7% BuNena in a nitrocellulose based binder system, as in claim 6 of the subject application.

Signed:   
Thelma G. Manning

Dated: May 4, 2009

Sworn and Subscribed to  
before me this 4th day  
of May, 2009.



LINDA MARIE MARCEAU  
NOTARY PUBLIC OF NEW JERSEY  
My Commission Exp Sept, 5, 2012